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EXAMINER	
PRENDERGAST, ROBERTA D	

ART UNIT	PAPER NUMBER
2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/039,187	YU ET AL.	
	Examiner	Art Unit	
	Roberta Prendergast	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 02 June 2006.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-23 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-23 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114 was filed in this application after appeal to the Board of Patent Appeals and Interferences, but prior to a decision on the appeal. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 6/2/2006 has been entered.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Independent claim 12 discloses the limitation of "An apparatus for interfacing with a surface within a computer-aided drawing environment, comprising: a software program stored on a computer readable medium..." and independent claim 18 discloses the limitation of "A system for interfacing with a surface within a computer-aided drawing environment, comprising: a computer system having a display unit and an input device; a computer readable medium coupled to the computer system, the computer readable medium comprising a software program...". There is no disclosure in the specification of a computer-readable medium.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification teaches wherein at step 134 a P x 1 surface condition is converted to an N x M surface condition and further teaches wherein step 134 may be used to convert other surface conditions, such as 1 x P, 1 x Q and M x N, into N x M surface conditions, see page 18, lines 22-30; page 20, lines 7-18, but does not teach wherein conversion to an N x M surface condition is performed if and only if it is determined that the plurality of curves constitute a P x 1 surface condition as claimed in independent claims 1, 7, 12 and .

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Harada et al. U.S. Patent No. 5345546.

Referring to claim 1, Harada et al. teaches a method for interfacing with a surface within a computer-aided drawing environment, comprising: determining that a plurality of curves operable to define the surface constitute a P x 1 surface condition, a P x 1 surface condition being defined by a number of first curves equal to P and only one second curve, wherein P is an integer greater than zero (Abstract; Fig. 3A; column 2, lines 14-20, 31-35, and 47-51, i.e. it is understood that the boundary curve is the second curve separating two surfaces and the first curves P are the curves that are connected at the two ends of the boundary curve such that surface Sa is a surface having a P x 1 surface condition); if and only if it is determined that the plurality of curves constitute a P x 1 surface condition, converting the P x 1 surface condition into an N x M surface condition, an N x M surface condition being defined by a number of third curves equal to N and a number of fourth curves equal to M, wherein N and M are integers greater than one; constructing an N x M surface under the N x M surface condition (Fig. 3D); and modifying the N x M surface to edit a drawing (Figs. 3A-3F; column 5, lines 27-54, i.e. in

the case wherein surface Sa and surface Sb are two surfaces having the P x 1 surface condition such that the spine curve is the guiding curve and the curves P are connected at the two ends of the guiding curve then two Bezier curves C(j,a) and C(j,b) are generated along the spine curve and are the new M second curves and arcs A(2j) and A(2j-2) are the new N first curves thereby converting the P x 1 surface into an N x M surface under the N x M surface condition that n=4 and n Gregory Patches are then generated thereby modifying the N x M surface to edit a drawing).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al. U.S. Patent No. 5345546 in view of Konno et al. U.S. Patent No. 5619625.

Referring to claim 2, the rationale for claim 1 is incorporated herein, Harada et al. teaches the method of Claim 1, wherein converting the P x 1 surface condition into an N x M surface condition comprises generating Gregory Patches comprising at least one auxiliary curve (see Figs. 3(D-F), 13(A-D), elements C^j (subscript a and b), A^{2j-2} and A^{2j}) having tangential continuity, as G^1 continuity, but does not specifically teach generating

at least one auxiliary curve that is substantially continuous with any adjoining surfaces of a surface having the P x 1 surface condition and compatible with the number of first curves and the only one second curve that define the P x 1 surface condition.

Konno et al. teaches generating at least one auxiliary curve that is substantially continuous with any adjoining surfaces of a surface having the P x 1 surface condition and compatible with the number of first curves and the only one second curve that define the P x 1 surface condition (Figs. 20-21; column 5, lines 20-29 and 35-48, i.e. the G^1 continuity of the boundary curve is checked at the endpoints and saved in memory and then used as the condition of continuity when generating auxiliary curves thereby ensuring that the auxiliary curve is compatible with the number of first curves and the one second curve).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Harada et al. to include the teachings of Konno et al. thereby providing a free-form surface generation method that has the following advantageous features; (1) joining smoothly two adjacent free-form surfaces sharing a boundary curve of any type (e.g., composite curve) by creating interior control points determined by the condition of connection on the boundary, which is derived from the condition of continuity on the boundary, which is determined by the boundary curve and other curves connected thereto; (2) generating free-form surfaces smoothly connected to each other by creating the control points for all the boundary curves and combining those control points; (3) generating a free-form surface in (2) which is smoothly joined to adjacent Gregory patches; (4) generating a

free-form surface in (2) which is smoothly joined to adjacent rational boundary Gregory patches; (5) representing complex curve mesh by as few curves as possible in (2); (6) interpolating only one, if possible, surface into curve mesh in (2); and (7) keeping C^n continuity on a surface within the boundary curves (Konno et al. column 3, lines 8-27).

Referring to claim 3, the rationale for claim 1 is incorporated herein, Harada et al. teaches the method of Claim 1 but does not specifically teach wherein converting the P x 1 surface condition into an N x M surface condition comprises generating an N x M surface condition to replace the P x 1 surface condition.

Konno et al. teaches wherein converting the P x 1 surface condition into an N x M surface condition comprises generating an N x M surface condition to replace the P x 1 surface condition (Figs. 11-13; column 11, lines 23-39, i.e. a plurality of Gregory patches are generated thereby creating an N x M surface condition to replace the Px1 surface condition).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Harada et al. to include the teachings of Konno et al. thereby providing a free-form surface generation method that has the following advantageous features; (1) joining smoothly two adjacent free-form surfaces sharing a boundary curve of any type (e.g., composite curve) by creating interior control points determined by the condition of connection on the boundary, which is derived from the condition of continuity on the boundary, which is determined by the boundary curve and other curves connected thereto; (2) generating free-form surfaces smoothly connected to each other by creating the control points for all the boundary

curves and combining those control points; (3) generating a free-form surface in (2) which is smoothly joined to adjacent Gregory patches; (4) generating a free-form surface in (2) which is smoothly joined to adjacent rational boundary Gregory patches; (5) representing complex curve mesh by as few curves as possible in (2); (6) interpolating only one, if possible, surface into curve mesh in (2); and (7) keeping C^n continuity on a surface within the boundary curves (Konno et al. column 3, lines 8-27).

Referring to claim 4, the rationale for claim 1 is incorporated herein, Harada et al. teaches the method of claim 1 but does not specifically teach wherein converting the Px1 surface condition into an N x M surface condition comprises generating an NxM surface condition defined by the third and fourth curves such third and fourth curves are defined by mathematical equations all having an order no greater than mathematical equations defining the first and second curves.

Konno et al. teaches wherein converting the Px1 surface condition into an NxM surface condition comprises generating an NxM surface condition defined by the third and fourth curves such third and fourth curves are defined by mathematical equations all having an order no greater than mathematical equations defining the first and second curves (column 5, lines 20-48; column 11, lines 56-65, i.e. the third and fourth curves are generated according to the control points and weights of the boundary curve whether the curve is rational or polynomial and thus is defined by mathematical equations having an order no greater than the first and second curves equations).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Harada et al. to include the

teachings of Konno et al. thereby providing a free-form surface generation method that has the following advantageous features; (1) joining smoothly two adjacent free-form surfaces sharing a boundary curve of any type (e.g., composite curve) by creating interior control points determined by the condition of connection on the boundary, which is derived from the condition of continuity on the boundary, which is determined by the boundary curve and other curves connected thereto; (2) generating free-form surfaces smoothly connected to each other by creating the control points for all the boundary curves and combining those control points; (3) generating a free-form surface in (2) which is smoothly joined to adjacent Gregory patches; (4) generating a free-form surface in (2) which is smoothly joined to adjacent rational boundary Gregory patches; (5) representing complex curve mesh by as few curves as possible in (2); (6) interpolating only one, if possible, surface into curve mesh in (2); and (7) keeping C^n continuity on a surface within the boundary curves (Konno et al. column 3, lines 8-27).

Referring to claim 5, the rationale for claim 1 is incorporated herein, Harada et al. teaches the method of claim 1 but does not specifically teach processing the first curves and the second curve so that each one of the first curves and second curve are compatible with each other of first curves and the second curve.

Konno et al. teaches processing the first curves and the second curve so that each one of the first curves and second curve are compatible with each other of first curves and the second curve (Fig. 16; column 11, lines 57-65, i.e. it is understood that generating a curve mesh in which the various Gregory patches that correspond to the

various first curves are joined together at the second boundary curves is processing the first curves and second curve so that they are compatible with each other).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Harada et al. to include the teachings of Konno et al. thereby providing a free-form surface generation method that has the following advantageous features; (1) joining smoothly two adjacent free-form surfaces sharing a boundary curve of any type (e.g., composite curve) by creating interior control points determined by the condition of connection on the boundary, which is derived from the condition of continuity on the boundary, which is determined by the boundary curve and other curves connected thereto; (2) generating free-form surfaces smoothly connected to each other by creating the control points for all the boundary curves and combining those control points; (3) generating a free-form surface in (2) which is smoothly joined to adjacent Gregory patches; (4) generating a free-form surface in (2) which is smoothly joined to adjacent rational boundary Gregory patches; (5) representing complex curve mesh by as few curves as possible in (2); (6) interpolating only one, if possible, surface into curve mesh in (2); and (7) keeping C^n continuity on a surface within the boundary curves (Konno et al. column 3, lines 8-27).

Referring to claim 6, the rationale for claim 1 is incorporated herein, Harada et al. teaches the method claim 1, but does not specifically teach modifying additional surfaces having the condition to edit the drawing.

Konno et al. teaches further modifying additional surfaces having the condition to edit the drawing (Fig. 16; column 11, lines 57-65, i.e. it is understood that generating a

curve mesh in which the various Gregory patches that correspond to the various first curves are joined together at the second boundary curves is processing the first curves and second curve so that they are compatible with each other for additional surfaces).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Harada et al. to include the teachings of Konno et al. thereby providing a free-form surface generation method that has the following advantageous features; (1) joining smoothly two adjacent free-form surfaces sharing a boundary curve of any type (e.g., composite curve) by creating interior control points determined by the condition of connection on the boundary, which is derived from the condition of continuity on the boundary, which is determined by the boundary curve and other curves connected thereto; (2) generating free-form surfaces smoothly connected to each other by creating the control points for all the boundary curves and combining those control points; (3) generating a free-form surface in (2) which is smoothly joined to adjacent Gregory patches; (4) generating a free-form surface in (2) which is smoothly joined to adjacent rational boundary Gregory patches; (5) representing complex curve mesh by as few curves as possible in (2); (6) interpolating only one, if possible, surface into curve mesh in (2); and (7) keeping C^n continuity on a surface within the boundary curves (Konno et al. column 3, lines 8-27).

Referring to claim 7, claim 7 is similar in scope to claims 1 and 2 and therefore the rationale for the rejection of claims 1 and 2 is incorporated herein.

Referring to claims 12 and 18, the rationale for claim 2 is incorporated herein, Harada et al. teaches a system for performing the methods of claims 12 and 18 but

does not specifically teach a software program stored on a computer readable medium and operable, when executed on a processor to perform the methods of claims 7 and 2. It would have been obvious to one having ordinary skill in the art at the time the invention was made that a computer aided drafting system capable of performing the method described would necessarily comprise a software program stored on a computer readable medium and operable, when executed on a processor to perform the methods of claims 7 and 2 as described above.

Referring to claims 8-11, 13-17, and 19-23, claims 8-11, 13-17, and 19-23 are similar in scope to claims 1-6, 7, 12 and 18 and therefore the rationale for the rejection of claims 1-6, 7, 12 and 18 are incorporated herein.

Response to Arguments

Applicant's arguments filed 6/2/2006 have been fully considered but they are not persuasive.

Applicant argues that Harada does not teach determining that a plurality of curves define a P x 1 surface condition such that a P x 1 surface condition is converted to an N x M surface condition if and only if it is determined that the surface condition is a P x 1 surface condition.

Examiner respectively submits that the applicant does not specifically define the section and guiding curves in such a way that the section curves and guiding curves differ from the edges that connect the surfaces and in fact teaches wherein a P x 1 surface is connected to an N x M surface along an edge that is defined as a section

curve, see Fig. 2D and page 14, line 8 through page15, line 9, i.e. surface 34 having section curves 31 and 33 and guiding curves 35 and 37 is understood to have an N x M surface condition and is connected to surface 38 via section curve 33 and surface 38 is also connected to surface 42 via section curve 45 and surface 46 is connected to surface 42 via section curve 47. It is understood that surfaces 38 and 46 both have a P x 1 surface condition wherein, for surface 38, two section curves, 41 and 43, and one guiding curve 39 provide a 2 x 1 surface condition and, for surface 46, one section curve 55 and one guiding curve 57 provide a 1 x 1 surface condition. It is noted that section curves 37, 43, 53 and 55 all connect at their respective edges defined by guiding curves 33, 45 and 47. Examiner further submits that applicant teaches wherein surface conditions 1 x P, 1 x Q and M x N are also converted to an N x M surface condition thus teaching against converting to an N x M surface condition if and only if a p x 1 surface condition has been determined, see the specification as originally filed, page 20, line 7 through page 21, line 14. Thus, it is respectfully submitted that Harada teaches wherein surfaces Sa and Sb are converted from a P x 1 surface condition to an N x M surface condition such that a P x 1 surface, having one guiding/spine curve and two section curves connected at either end of the guiding/spine curve for each of the surfaces, for a total of four section curves, is converted to an N x M surface condition such that the use of the boundary curve, that has been previously defined, implies the determination of only one second curve being identified as a boundary curve and the determination of a number of first curves equal to P that are not boundary curves.

Applicant argues, with respect to Konno, that "...there is no indication in Konno that the disclosed "condition of continuity" is analogous to Applicant's recited "auxiliary curve that is . . . compatible with the number of first curves and the only one second curve that define the P x 1 surface condition." In fact, there is no disclosure in Konno at all of the meaning of G1 continuity as applied to the end points of the boundary curve...".

Examiner respectively submits that Konno teaches wherein, for the NURBS surface, the continuity between surface patches depends on the knot vectors and control points (column 2, lines 9-15) and Harada et al. teaches that Gregory Patches G(j) and G(j+1) are connected to each other with tangential continuity G^1 and that G(j) is connected to the basic patch B(j) with G^1 continuity thus continuity between patches indicates compatibility.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, adding auxiliary curves in order to smoothly join two adjacent free-form surfaces sharing a boundary curve of any type (e.g., composite curve) such that the continuity is preserved, as

indicated in the motivation statements above, is sufficient motivation for combining Harada with Konno.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberta Prendergast whose telephone number is (571) 272-7647. The examiner can normally be reached on M-F 7:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RP 2/14/2008

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER